The Meaning of RUFAL Value

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What Does RUFAL Stand For?

Rumen

Unsaturated

Fatty

Acid

Load
What Does RUFAL Mean?

• It is the total unsaturated fatty acid supply entering the reticulo-rumen each day from feed consumed.

• RUFAL accounts for intakes of unsaturated fatty acids from all feed ingredients rather than fatty acid intake coming only from fat supplements.

• Designed to be better indicator of fermentation disruption in the reticulo-rumen than relying just on the percentage of fat added to the diet.
How is RUFAL Calculated?

• RUFAL is calculated as the **sum of the three primary unsaturated fatty acids consumed** by dairy cattle, namely oleic (C\text{18:1}), linoleic (C\text{18:2}), and linolenic (C\text{18:3}) acids.

• RUFAL has been expressed in grams per day or as a percentage of the feed DM to account for differences in feed intake.
### Calculating RUFAL Example

**Unsaturated Fatty Acids** | **Dry Matter Sample Basis %**
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18:1 | 0.87
18:2 | 2.31
18:3 | 0.24

**RUFAL** | **3.42**
What are the negative consequences of high RUFAL values?

• Past studies show increasing RUFAL will eventually cause fermentation disruption, which can have negative effects on animal performance.

• Reduced feed intake and ruminal carbohydrate digestibility can lead to reduced milk production when RUFAL becomes excessive.

• Another negative consequence of excessive RUFAL is milk fat depression.
How much does the basal feed ingredients contribute to RUFAL versus the amount of fat supplements in the diet?

• The basal diet can account for the majority of RUFAL, often reaching as much as 70% of total unsaturated fatty acids consumed.
• Fatty acid concentrations in forages and grains typically range from 2 to 4% of DM, but their high intakes expose the rumen microbial population to a considerable lipid load.
• Lipid contributions from the basal diet are often overlooked, with much of the focus directed at fatty acid contributions from the fat supplements only.
• As a result of ignoring basal lipid contributions, variability in animal responses often do not line up with added fat levels.
How can RUFAL help in solving production problems?

• Elevating FA concentration in ruminal contents may cause a number of changes in ruminal fermentation characteristics and microbial population distribution. Because some bacterial species are more susceptible than others, the result is a microbial shift in the rumen.

• Simply as a guideline, **RUFAL values below 3.5% of the diet DM** generally indicate that **lipid load in the rumen is not excessive** and likely not the primary cause of production problems such as milk fat depression.

• **RUFAL values above 3.5% of the diet DM** is a red flag that fat intake is on the high side and **closer scrutiny is needed** to examine all possible risk factors such as excessive fat intake, low rumen pH, amount and type of grain, and forage characteristics.
What RUFAL is NOT

• **Caution** is most important to **not** interpret the 3.5% guideline as a threshold beyond which milk fat depression is likely and below which milk fat depression does not occur.

• A **repeatable and accurate RUFAL value** capable of predicting milk fat depression has not yet been established.
Do bypass fats count in RUFAL?

- Yes to the extent they contain unsaturated fatty acids.
- RUFAL, by definition, accounts for intakes of unsaturated fatty acids from all feed ingredients, bypass fatty acids are included as well.
How does knowing RUFAL help me solve my butterfat depression issues?

• If production problems like milk fat depression are being diagnosed, knowing **RUFAL is just the beginning.** RUFAL exceeding the 3.5% red flag level suggests unsaturated fatty acid intake is on the high side, and the next step is to examine the sources of the high RUFAL.

• Higher risk fat sources, like DDG and processed oilseeds, are good candidates to reduce in cases of milk fat depression. **Bypass fats contribute to RUFAL but are lower risk for milk fat depression problems due to their rumen protection.**
Can RUFAL values be too low?

• The linoleic and linolenic acids that comprise RUFAL are classified as essential fatty acids (EFA) that are needed for proper tissue function but are not synthesized by body tissues.

• Although there is a strict requirement for adequate EFA, typical TMR fed to dairy cattle contain adequate unsaturated fatty acid to prevent most of the classical deficiency symptoms.

• High production demands, however, may stress EFA balance, with positive benefits of EFA supplementation reported for reproduction and immunity.
BIG FAT IDEAS

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